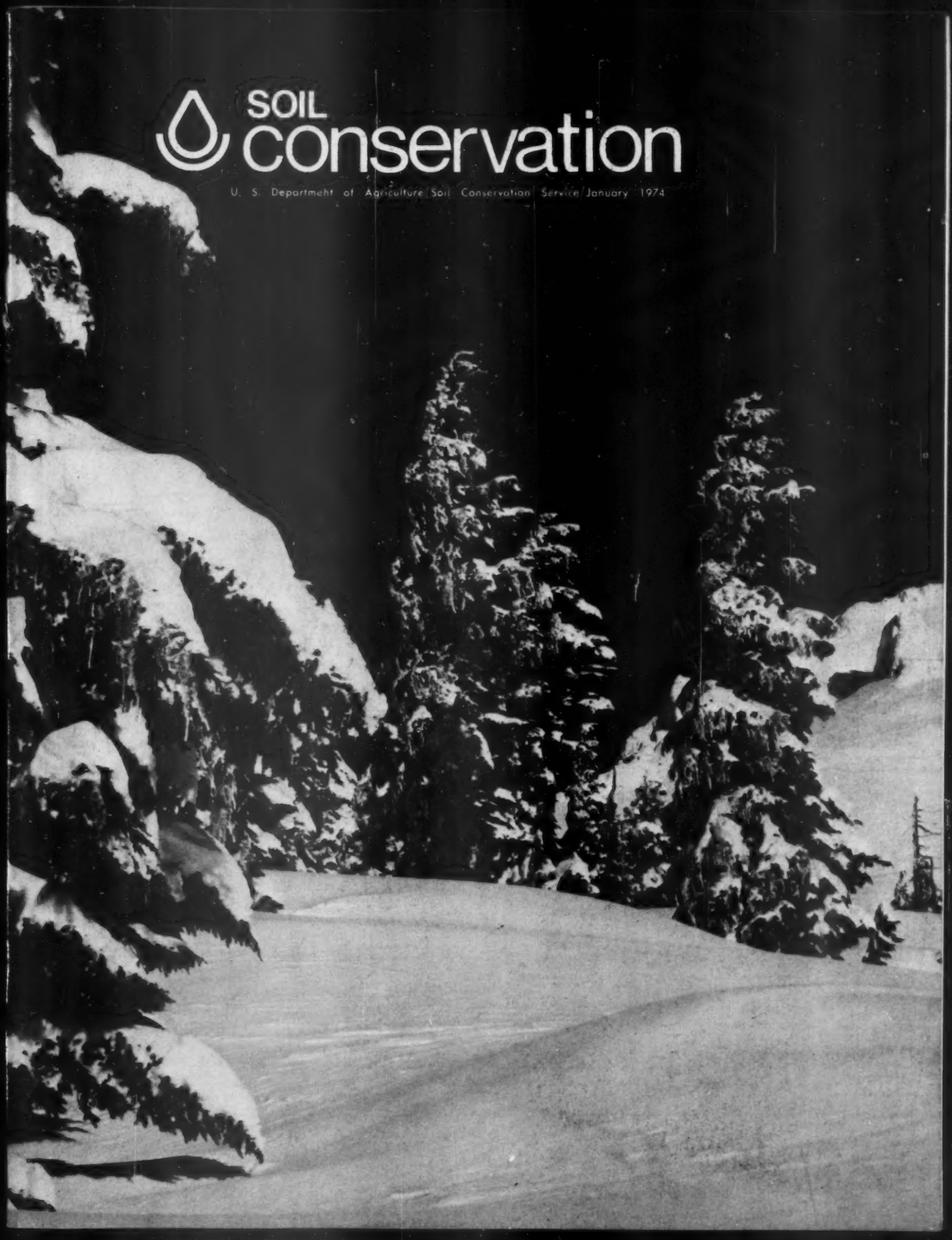
SOIL
conservation
U. S. Department of Agriculture Soil Conservation Service January 1974

New year, new challenges

In the year just past, the Soil Conservation Service helped more than 30,000 different units of state, federal, or local governments with soil and water conservation plans or problems. This included assistance to planning boards, technical help to zoning authorities and land developers, and consultations with local leaders working to help increase income and improve living conditions in rural communities.

This work will continue in 1974. But it will be coupled with a renewed concern for the problems of America's farmers as they work toward producing more crops—on protected land—during the current year of intensified agricultural activity.

Today's farmers are far more knowledgeable about basic conservation principles than were those of their father's generation. The need for conservation is well understood; the real challenge is to help farmers combine the best methods of crop production with the best methods of soil and water protection so that their land remains fertile and productive—economically and ecologically viable—over a long period of time. As always, conservation district leaders will be in the forefront of this work.

Because the same basic principles of soil, water, and plant management apply to all land whatever its use, it is not necessary to create a new profession for conservation work in urbanizing areas. But—as more people call upon us for help—it is necessary for us to plan new and creative methods of doing more with less money and manpower.

The recognization is growing that the Soil Conservation Service has much to offer in community development work. In addition to consultation with local authorities on specific local problems, we provide technical assistance to resource conservation and development projects, to small watershed projects, and to other formal resource conservation work. And, of course, soil surveys and soil interpretations are well recognized as valuable tools for both the farmer and the town planner.

So, 1974 will be a year of increased conservation concern on both America's farmlands and in her growing towns and cities. In the Soil Conservation Service, we must examine our priorities carefully. We cannot do everything that people want us to do. We cannot even do everything that we want to do. But I am confident that we can, and will, meet our primary obligations to land users and planners in ways that continue to make us proud of our Service—and our services.

Kenneth E. Grant

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Soil survey "infantry" goes airborne

by Bernhard A. Roth
Public information officer, SCS
Upper Darby, Pennsylvania

Vermont has put wings on the boots of its fence-jumping, bog-slogging, soils-mapping "foot soldiers"—the Soil Conservation Service's soil survey team.

Pioneer surveyor flights in a helicopter have shown it's possible to "skywalk" a rugged Green Mountain township's multithousand acreage.

The initial move toward speedier means of furnishing Vermonters accurately mapped inventories of the riches and hazards of their scenic countryside began in Windham County. Supervisors of the Windham Natural Resources Conservation District have been eager to respond to pressures for soils data sought by fast-growing towns.

The pedestrian pace of mapping the local soils has been frustrating to Windham's community and conservation leaders. Planners clamored for the data needed to head off chaotic siting of homes, schools, shopping centers, and ski centers.

Urgent demands for site facts in many developing towns might well go begging for a decade or longer. The information delivery schedule was hooked to a soil scientist's walking pace—one stride at a time, through all sorts of terrain—as he sampled, observed, and recorded his findings.

The conservation district's decision to try wings on survey operations found a ready volunteer in David Gilman, SCS soil scientist stationed at Brattleboro. A licensed pilot himself, Gilman had long felt that basic facts about Vermont's landscape were quickly revealed to a skilled flying observer. Test hops using conventional fixed-wing planes over survey areas were encouraging.

Feeling there'd be merit in skimming lower and slower—with the option of hovering in midair for closer scrutiny of an area—Gilman judged a helicopter would be most suitable.

The first serious, go-for-broke, soils-inventorying effort using the bird's eye technique took place on a brisk spring morning over Londonderry. Beleagured by the headlong push for new roads, new impoundments, new ski areas, new holiday colonies—and the urgency of planning them intelligently—town officials had willingly agreed to finance the fledgling flight.

In the chopper at lift-off were Gilman and veteran rotorcraft pilot, William Rhoades from Sugarbush Valley, a famed tourist mecca in northern Vermont. Each had done careful homework before soaring up over leafless trees and fields still soggy from thawing snow and ice. And they had briefed each other thoroughly on the flight path, elevations, and safety precautions needed for an efficient sortie.

Gilman had a lapful of aerial photos, arranged in flight sequence, with navigational landmarks clearly plotted on each. His shirt pockets were crammed with pencils and crayons.

Swooping low across London-

Going over the flight plan. William Rhoades (above, on the left), helicopter pilot, and David Gilman, SCS soil scientist, brief each other thoroughly before making a tree-top survey of rapidly expanding Vermont townships. Before takeoff (below), Gilman readies the aerial photomaps on which he plots information while airborne.

derry's ever-changing topography and cataloging its features proved —in Gilman's words—"one of the busiest and most rewarding sessions of survey work I've ever experienced."

For the soil scientist, there was the challenge to summon up his many years' familiarity with the giveaway signs that indicate soil boundaries—and do so in a matter of fleeting seconds—as swamps, grasses, trees, rock outcrops, and other landscape features flashed beneath and around the bubble canopy.

For the chopper pilot, there was the need for instant, reflexive action at the controls to keep the craft on an accurate course, at a practical speed, and at the best observational level above the twisting, dipping, climbing landforms that make Vermont unique among the states.

Checking the results of the flying survey back at his Brattleboro office, Gilman expressed his evaluation in the restrained language of routine agency reports. But the nitty-gritty facts of the airborne inventory were dramatic. He had recorded the major resources of the town's 21,000 acres in approximately 1 hour.

There was still an infantry-type job to be done: spot checking of soil secrets accessible only to the auger and spade; more thorough and closeup scrutiny of

In minutes the flying soil surveyor compiles basic mapping data that normally take days of rigorous walking.

intermingled soil types. Gilman spent 35 days confirming, correcting, and supplementing information logged from the air.

At the end of the period, an accounting of the experiment could hardly avoid an enthusiastic tone.

The objective—to gather all the scientific data needed to compile and reproduce a map of Londonderry's soils—had been achieved. It had been done for approximately $2,000 in basic costs—one-half the usual accepted outlay. More important to many, the time spent in getting the vital information had been cut in half.

To the supervisors of Windham County Natural Resources Conservation District, the results offered hope in responding to 14 towns pleading for soils information.

Interest in the aerial operation sparkled among the ranks of Vermont's SCS men when Gilman narrated his firsthand observations at the invitation of state conservationist, Craig Right, and state soil scientist, Bruce Watson.

"Chopper surveying," said Gilman, "does demand quick judgments and plenty of boning up on the area to be flown. It also needs a person who can make himself comfortable in the air. But the plusses to be gained are more than just speed. From about 200 feet aboveground, which Bill Rhoades and I maintained, you can see how a whole span of features relate to one another—features you miss crawling through the brush.

"As far as I'm concerned, this opportunity to study the land via the 'flying fish-bowl' was the first time I didn't feel like the proverbial ant in the hayfield." ♦

Research plus action

by Sharon L. Norris
Information specialist, SCS
Boise, Idaho

and Dr. Lloyd M. Cox
Snow hydrologist, ARS
Boise, Idaho

In Boise, Idaho, more accurate techniques for measuring the water content of snow and for forecasting water supplies are emerging from the cooperative efforts of the Agricultural Research Service and the Soil Conservation Service.

ARS' Northwest Watershed Research Center and SCS have designed a program to get quality measurements from key sites to refine short- and long-term snowmelt runoff forecasts. Electronic facilities, personnel, instrumentation, transportation, and instrument shelters at six remote snow-course sites are shared by the two agencies.

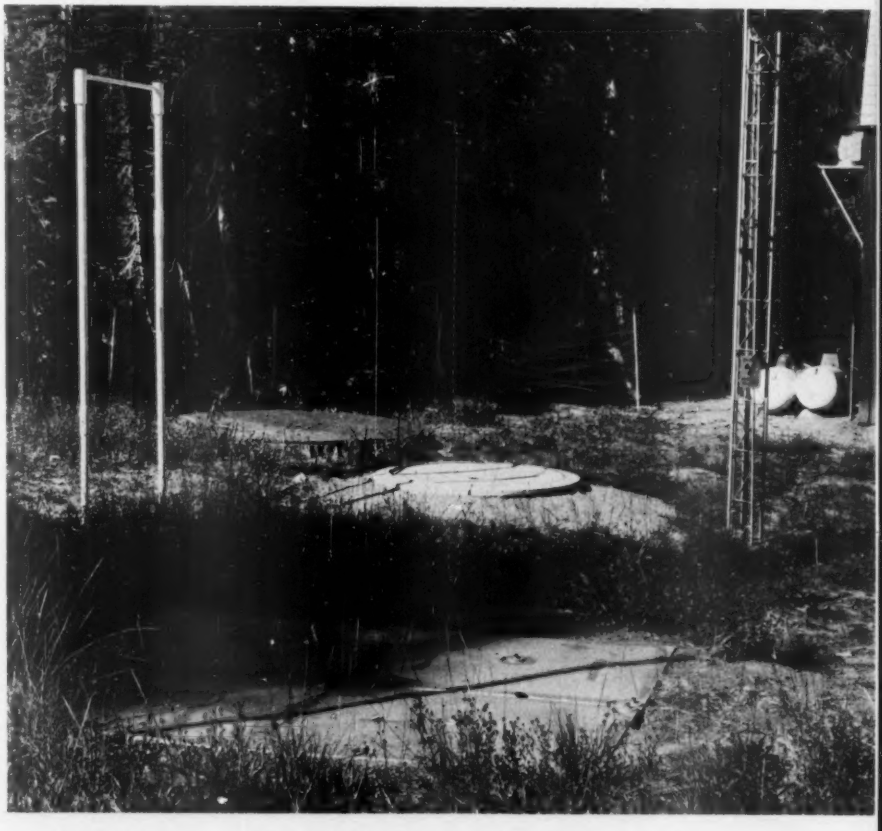
One of the key sites is at the Trinity Mountain guard station on the headwaters of the Boise River at an elevation of 7,780 feet. Typical data telemetered daily to Boise include (1) water equivalent of the snowpack as determined by isotopic gages, snowpillows, and universal gages; (2) water flowing from the base of the snowpack as collected by a 10-foot-diameter melt collector and a 5-foot-diameter universal gage; (3) precipitation as measured by a heated, tipping bucket rain gage; (4) air and instrument shelter temperatures; and (5) various battery voltages and system checks.

Power for the equipment at the site comes from nickel cadmium and sealed lead acid batteries that are trickle charged by several solar panels. A thermoelectric generator is kept at the site for emergencies and for special study use.

More efficient use of personnel and equipment has resulted from this cooperative effort. Also, an ideal situation exists because a research agency is working directly with an action agency. ARS, for example, developed a short-term snowmelt runoff model that has been tested successfully on basins ranging in size from 100 acres to 830 square miles.

A long-term water supply forecast model also has been developed and is proving to be more accurate than forecast models currently in use. A heat balance study of the snowpack has been conducted to refine existing snowmelt formulas.

Research plus action are really paying off in Idaho. ♦



This is what a snow study site looks like before the snowfall covers it up. The water equivalent of the snowpack is determined by measuring the pressure changes inside the snowpillow, in the foreground, as the depth of the snowpack changes over the pillow.

Last of a vanishing breed

by Dan F. Croom
Former public information officer, SCS
Stillwater, Oklahoma

"You load 16 tons, and what do you get?"

If you're strip mining, you get jagged, raw, eroding spoil banks. But coal producers, like Frank McNabb of Catoosa, Oklahoma, are taking aggressive steps to minimize any adverse environmental effects from their mining operations.

McNabb is among the last of a vanishing breed, an independent coal producer. He began reclaiming spoil banks back in 1958 on 450 acres of land. He said that state legislation pending at the time on strip mine reclamation motivated him to turn in that direction.

"I knew it was just a matter of time before we would be required to start reclaiming spoil banks," McNabb said. "I thought I might as well learn as much as I could on my own land while I had the chance."

Frank McNabb (left), an independent coal producer, has revegetated this strip-mined area with bermudagrass and yellow hop clover. Sherman Lewis, SCS district conservationist, periodically offers assistance.

Sherman Lewis, the Soil Conservation Service's district conservationist in Claremore, has worked with McNabb in establishing permanent grasses on smoothed spoil banks.

"The Oklahoma Legislature did pass a comprehensive strip mine reclamation act in 1967," Lewis said, "but it would be incorrect to credit the legislation totally for what the McNabb Coal Company has done since that time. McNabb has gone beyond the letter of the law to get his mined areas protected from erosion and returned to productive use."

Last spring, McNabb seeded a 35-acre tract of reclaimed land to fescue, lespedeza, and clover. He applied 200 pounds per acre of a balanced fertilizer, which helped get the grass and legumes off to a fast start.

"Limited grazing is an important part of getting these seedings well established. Overgrazing

tends to weaken the stand," Lewis commented.

McNabb has discovered that a good job of strip mine reclamation costs money. The reclamation process involves stockpiling topsoil if there is any, smoothing the spoil bank ridges down to a rolling topography, and seeding the area to adapted grasses and legumes.

"The work we've been doing lately has been costing as much as $2,000 an acre," the veteran coal producer said. Then he added, "A good reclamation job has some definite economic advantages. The leasing of mineral rights can get quite competitive at times. It doesn't hurt a bit to take a landowner to a reclaimed area and show him what it looks like when the job is finished.

"The State Mine Inspector's office has used our work as an example for other mining concerns in Oklahoma and in other states," McNabb noted with a measure of pride. Conservationists studying spoil bank vegetation practices have toured his mine sites to observe the work being done.

Reclamation is one of a multitude of tasks that face an independent coal producer. McNabb's list of high priority duties as sole proprietor of his 60-year-old firm includes lease acquisition, exploration, equipment purchasing, personnel management, and sales. Besides all that, he finds time to care for his commercial beef cowherd on his farm southeast of Catoosa.

Acquiring leases is the first step in the coal mining process. Then comes core drilling on 100-foot grids to determine the exact location, extent, and quality of the coal. If the core drilling shows that there's no coal, the site is abandoned and the cost of the lease is absorbed by the firm.

"Of course when you've worked in this business as long as I have, you pretty well know where the coal is and where it isn't," McNabb said. He looks for outcroppings of particular rocks to confirm his notions of where the fossil fuel can be found.

Much of McNabb's mining activities involve reworking strip pits excavated 10 to 20 years ago. In those days, many sites were mined down to about 40 feet. Because of advances in excavating machines, stripping operations now go down 60 or 70 feet.

Production from stripping operations varies, but McNabb said that most areas yield from 2,000 to 2,500 tons per acre. Mineral rights owners are paid a royalty for each ton of coal mined.

Customers for McNabb's coal are scattered far and wide. Shipments are made regularly to Los Angeles, Kansas City, and Mexico. Some sales for domestic use are made in Oklahoma, Kansas, Missouri, and Arkansas.

The use of coal for domestic purposes has declined drastically in the last 30 years. McNabb himself is the only one affiliated with his company who still uses coal for heating his home. He believes, however, that increasing energy demands and shortages of natural gas point to greater use of coal in the years to come.

Regardless of what the future brings, one thing's certain—Frank McNabb will continue reclaiming his spoil banks. He's not a past winner of the title "Conservationist of the Month" for nothing. The honor was bestowed by the Rogers County Conservation District. ♦

Watershed protection project makes it— a living creek

by Gordon S. Smith
Public information specialist, SCS
Upper Darby, Pennsylvania

"You can't do much fishing in a dry creekbed," cracked Hughson Case, a Franklinville, New York, native.

That was Case's candid description of Gates Creek the way it was 10 years ago. The creek was one of the misused tributaries of Ischua Creek, a major stream in Cattaraugus County.

Flooding and excessive soil erosion were major land and water evils that faced the county 10 years ago. Today, with a self-initiated watershed protection project nearing completion, Gates Creek has come back to life, and the entire 117-square-mile Ischua Creek watershed has had an economic uplift.

The Ischua Creek Watershed Protection and Flood Prevention Project was organized and planned by local conservation-minded people. Hughson Case, a former chairman of the Cattaraugus County Board of Supervisors, was a leading member of this group. Like his friends, he had seen Gates Creek deteriorate from a brook-trout paradise to a "sometimes flooding, sometimes dry" useless stream.

"Fishing in Gates Creek was great when I was a boy," Case recalled. "But, as years passed, the stream filled with mud and debris. Floods grew progressively worse. Then the stream began to run dry during summer."

The Gates Creek problem soon spilled across the community, generating enough interest to get community leaders to apply for federal and state aid in a watershed protection project for the entire Ischua Creek drainage area.

The project was approved, and the Ischua Creek Small Watershed Protection District was formed, according to New York law, with authority to levy taxes, acquire easements and rights-of-way, and let construction contracts. It wasn't long before construction was underway.

"The reasons for this healthy stream going bad are easy to explain," said Homer Stennett, an SCS soil conservationist. "It started years ago when people first moved into the watershed. Harvesting timber and plowing farmland uprooted too many acres of protective land cover. Soil washed away leaving deep gullies. The stream channels gradually filled with the displaced soil. When storms came, floodwater had no place to go. It spread across the valley and into Franklinville."

Many farmers along the stream added to the problem by grazing their cattle along the streambanks. Raw banks replaced natural protective cover. When highwater came, the exposed banks crumbled into the stream. As the raw streambanks dissolved, floodwater carved new channels across the valuable bottomland farms.

"The dry streambed stemmed from the same misused land," explained Stennett. "The soil lost its water-holding capacity as natural cover was torn lose. Most of the rain and melted snow ran off the land causing excessive flooding. When dry summer months came, very little moisture was left in the soil. What little came downstream quickly dropped below the shale bottom of the stream."

Today, a decade later, Gates Creek and the Ischua Creek valley are making a fast recovery. Damaging floods have diminished. Gates Creek never runs dry, and

fishing is getting better.

Erosion control measures got top priority in the overall watershed plan. According to Stennett, farmers have done an outstanding job in protecting their exposed acres. The land treatment has not only reduced the maintenance required for downstream channels and floodwater dams but also has contributed to the overall improvement of the watershed.

Augmenting the land treatment, seven dams, designed by SCS engineers, were built to check excess floodwater. One of these dams formed 30-acre Harwood Lake, which was planned and financed, for the most part, by the New York State Department of Environmental Conservation. The new lake has public fishing facilities.

The last dam to be constructed forms an 80-acre lake for recreation and flood control. The area includes a bathing beach and boating, picnicking, and fishing facilities. It has been named Case Lake in honor of Hughson Case.

While land treatment and dam construction were being carried out, channels were being improved with equal success. Bulldozers cleaned out years of accumulated rock, silt, and debris from clogged channels. Farmers fenced their cattle away from raw streambanks. Basket willow, lespedeza, and other shrubs were planted along these banks to provide cover plus food for wildlife. In some places, streambanks were protected by stone riprap and log cribbing.

Spinoffs from the Ischua Creek project aren't hard to find today. For example, many Franklinville industries considered moving to flood-safe communities just a few years ago. With flood protection insured, these industries decided to stay in Franklinville. Today they are expanding.

Flood damages that had averaged $75,000 a year in the past now rarely exceed $15,000.

Just north of Franklinville, 500 acres of flat land had been flooded too often by Ischua Creek to be used for anything. Today a golf course, clubhouse, and bowling alley complex cover the flood-protected area. This community recreation facility means jobs for 12 people and added tax revenues.

The Ischua Creek Watershed Project is nearly complete. According to Hughson Case, "The benefits already far exceed anything we expected. And we have a living creek now." ♦

In 1955, the creek at left was dry because of poor land management upstream, and cows grazing along the streambanks contributed to the erosion problem. Today, streams like the one below in the Ischua Creek watershed are protected by permanent vegetation.

Troops, trout, and Trout Unlimited

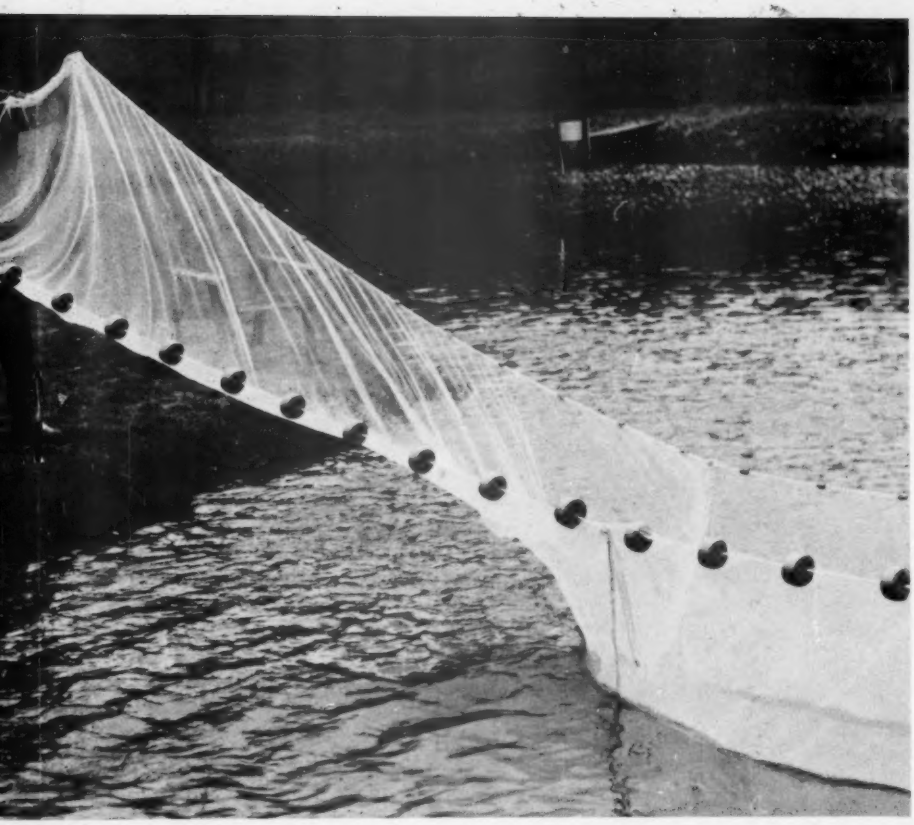
by Vincent J. Price
Information Division, SCS
Washington, D.C.

This is a fish story. Three fish stories, to be exact. Stories of different ways the Soil Conservation Service is helping to create or restore trout habitat.

Trout, one of the world's most popular game fish, has lost much of its natural habitat to pollution and land use changes. Offsetting this loss are the efforts of thousands of angler-conservationists. An organization called Trout Unlimited is in the forefront of this effort; local chapters all over trout country are organizing habitat improvement projects.

Sometimes Trout Unlimited asks the Soil Conservation Service for help. Years of experience in working with soils, plants, and watershed projects have given SCS the technical expertise that trout fanciers need.

The following fish stories have two things in common: in each, streams have been modified to



Trout Unlimited's Dr. John Woods (above) helps round up stocking trout by seining the nursery pond.
Sportsmen (far left) help collect the trout that will go into McMinn County, Tennessee, streams.
Lloyd Hess (left), a fisheries biologist with the New York Department of Environmental Conservation, checks the water depth in front of a pool-digging structure in the Little Hoosic River. The natural power of the waterfall carves out a cool pool for trout.

provide better habitat for trout, and trout fishermen themselves provided the enthusiasm and leadership to get the project moving.

An anti-erosion army

Stream improvement for trout is sometimes a long, hard, repetitive job—that's when conservationists wish they had a small army of volunteers. At least one group of conservationists literally got an army of volunteers—the U.S. Army.

Chautauqua County, on New York's Lake Erie shore, is a summer haven for increasing numbers of second-home owners from Cleveland and Buffalo. This influx has created an increased demand for sport fishing, so Trout Unlimited and the Soil Conservation Service started a program to preserve and restore trout habitat in the county's Mill Creek.

Flooding had severely damaged Mill Creek's banks. Streambank erosion was changing the creek from a cool, deep trout stream to an intermittent shallow creek.

One immediate but minor step was to improve the channel in a few places where the stream had fingered out. Channelization restored the "splintered" streamflows back into one channel.

The major task was to revegetate 1,000 feet of streambank. Horticultural students at two vocational-education schools provided 12,000 young purple-osier willows grown from shoots. And the Chautauqua County Soil and Water Conservation District and the county bought 5,000 more.

The problem was how to hand plant so many trees.

Dick Mudge, chairman of Trout Unlimited, contacted the U.S. Army Reserve's 98th Training Division, based in Jamestown, New York. Shortly after that, on a weekend drill, the reserve unit trooped off to Mill Creek to help some trout.

Under the command of Captain Robert Vandenburg, the men joined local volunteers in planting 13,000 willows. Students later planted the remaining 4,000. "In one weekend the Army planted the bulk of the willows," reported Larry Brown, SCS district conservationist. "It was fantastic."

Then again, in a way the Army reserve unit was simply doing its job, protecting U.S. soil—and coincidentally protecting U.S. trout.

Dams for trout

McMinn County, Tennessee, lies between the Great Smoky Mountains and the Tennessee River. Many streams in the county will support, if not spawn, trout. Trout Unlimited in McMinn County is determined to get trout into the streams and is fully prepared to restock potential streams every year.

Under the leadership of Dr. John Woods, chairman of the Biology Department at Tennessee Wesleyan College, Trout Unlimited launched an ambitious program to raise 4-inch brown trout to 12 inches and release them into local streams, where it is hoped they will grow to 18 inches.

The local chapter started by leasing an old trout farm. The farm's pools hold about 50,000 fish for stocking.

A survey was conducted in the 10-county area of the Southeast Tennessee Resource Conservation and Development Project to determine which streams within the project area could support trout. At the same time, SCS in McMinn County located about a dozen spring-fed farm ponds capable of supporting trout, and Trout Unlimited worked with the pond owners to stock these ponds.

Trout Unlimited's basic plan was to stock about 12 streams in McMinn county and then announce the stocking areas and streams to the public. But there were problems. Although generally the streams were deep and cold enough for trout, there were short "low-flow" periods that could cause massive fish kills. Fact is, as put by Howard Whitaker, the SCS district conservationist in McMinn County, "The water gets so low that the trouts' backs are visible above the water."

Low flows can be compensated, however, and one way is to build small dams. Water backs up behind the dams during low flows, and the trout survive there until the water level is back to normal.

Trout Unlimited started by tackling Little Sewee Creek. Using rocks and logs, work crews constructed six dams along the creek in July and August of 1972. Unfortunately, in October 1972 all six dams were washed away by a flood.

Not about to give up, Trout Unlimited rebuilt the dams. But the floods were persistent too. Five more floods set Trout Unlimited back where it started—with no protection at all against the low flows.

At that point, Trout Unlimited contacted SCS. A general plan for more sophisticated structures was prepared. Six dams are to be built on Little Sewee Creek, where the old log-and-rock dams washed out. Similar work on other streams is also envisioned.

Close cooperation between Trout Unlimited and the Southeast Tennessee RC&D Project is bound to continue, for Dr. Woods is now chairman of the RC&D wildlife and recreation committee.

Pool diggers

There's more than one way to deepen a stream. Conservationists in McMinn County use dams to forms ponds. Conservationists in Rensselaer County, New York, on the other hand, use log structures to dig out pools.

These "pool diggers" were developed by the New York State Department of Environmental Conservation. Logs jutting out diagonally from both sides of a stream channel deflect the entire streamflow up a slight ramp at the center of the channel. Cascading off the ramp, the stream forms a small waterfall. Within a matter of months, pressure from the waterfall carves out a cool pool where trout can stay during the hot summer days. In addition, a riffle area forms along the edges of the pool where the fish can feed at night and at dawn.

Pool diggers have been used for years in Rensselaer County, both by New York's DEC and by the Conservation Alliance, a federation of sportmen's clubs. As a result, streams such as Kinderhook Creek and the Little Hoosic River have been among the best trout streams in eastern New York.

Pool diggers have to be refurbished every 5 years or so, however, and those in Rensselaer County's streams had not been touched in 15 years. The Little Hoosic's structures had almost entirely vanished, and the pools had reverted to normal streambed.

In 1971, SCS offered to work with the Rensselaer County Soil and Water Conservation District and the Conservation Alliance to restore the Little Hoosic pool diggers.

Technically, what needed to be done to the Little Hoosic was clear enough to John Nigro, an SCS district conservationist: seven pool diggers had to be built, snags and debris had to be removed, and riprapping had to be installed. The real problem Nigro faced was one of logistics: how to obtain the necessary muscle, material, transportation, and equipment without spending nonexistent money.

Somehow, everything was coordinated: muscle came from the Neighborhood Youth Corps; on weekends, members of the Conservation Alliance pitched in. DEC designed the structures and ran construction checks. The town of Cherry Hill supplied tools, and the town of Berlin provided transportation. Landowners let the conservationists use their easements. The Berlin Highway Department offered a headquarters location, and the Conservation Alliance helped with supervision.

One of Nigro's biggest problems was getting a safe tool for the most dangerous part of the construction—pounding 6-foot concrete-reinforcing steel rods through the log deflectors into the streambeds. The Alleghany Ludlum Steel Corporation solved the problem by offering to design and build two special hand "pile drivers."

By the fall of 1971, 1,500 feet of the Little Hoosic had been improved for trout habitat. In the summer of 1972, SCS, DEC, and the Conservation Alliance joined a crew of Vietnam veterans working under the Emergency Employment Act to build 32 structures at various points along 7,000 feet of Kinderhook Creek. The team also built additional structures on the Little Hoosic.

The success of these programs encouraged the conservationists to continue the stream modification work in 1973. As for 1974, 1975, or 1976, the problem in Rensselaer County is still logistics. If they can crack the logistical difficulties, the New York sportsmen see this as a continuing program. So, there may be many more fish stories, fish trophies, and fish dinners to come. ♦

No scars on the landscape

by Calvin J. Perkins
District conservationist, SCS
Lancaster, New Hampshire

Two winters ago I was driving east on U.S. Route 302 near Carroll, New Hampshire, and saw trees on the steep slopes of Rosebrook Mountain being cut and large piles of brush being burned. Work had started on the area's new ski development.

A ski trail under construction. The Mount Washington Hotel is in the background.

My thoughts quickly turned to beautiful snow-covered Mount Washington to my left and the ice-laden Ammonoosuc River that flows peacefully along the base of Rosebrook Mountain to my right. Was this to be a haphazard development that would interrupt the picturesque views of the White Mountains and contaminate the clean water of this mountain stream?

No. It wasn't. Early into those winter months a representative of the Mount Washington Development Company contacted leaders of the North County Resource Conservation and Development Project. He was looking for technical assistance in planning and applying conservation practices in the ski development area to reduce erosion and sediment and protect the natural environment.

That contact resulted in a meeting of SCS people with planners, engineers, contractors, and others associated with the new ski complex. And it was the beginning of a successful effort to incorporate conservation concepts into the ski development.

The Soil Conservation Service, through the Coos County and Grafton County Conservation Districts, provided soil survey data on 2,500 acres. Soil data are basic to planning, and these data were used in planning the ski development, including 100 acres of cleared ski trails and sites for lift lines, underground snowmaking equipment, maintenance buildings, a lodge, condominiums, access roads, parking lots, and other related facilities.

The soil information included interpretative maps depicting various land use limitations.

Construction was halted late in winter because of the heavy snow accumulation. Fortunately, snowmelt the next spring did not cause excessive erosion. As soon as the land was dry enough for construction activity, the work was renewed.

SCS suggested improved methods of erosion control during construction. These were quickly adopted. They included two large sediment basins at the base of the mountain to settle out loose sediment and prevent it from entering the Ammonoosuc River. All of the small streams and suface water channels within the construction area were directed into two major drainageways that flowed into and through these sediment basins.

Culverts up to 6 feet in diameter were used to conduct water safely under access roads and across critical points on the ski slopes. Each culvert had stone headwalls at each end to prevent erosion and to provide a rustic appearance in keeping with the setting.

Temporary diversions were roughed in across the ski slopes after stumps and boulders were removed and were kept free of debris at all times. These were spaced about 50 feet apart on slopes greater than 35 percent and not more than 200 feet apart on slopes of less than 35 percent.

These diversions broke long slopes into short ones, reduced the potential for erosion, and took

the excess water off the area in an orderly manner.

During the final grading, which began at the top of the slopes, workers seeded, fertilized, and mulched as they moved downslope, never leaving more than 500 feet without proper cover or exposed to erosion.

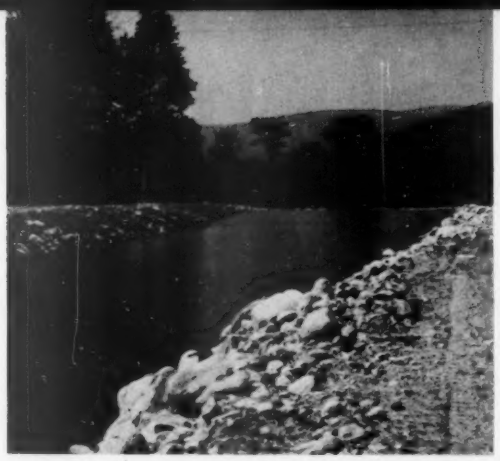
Permanent diversions were installed where necessary on a grade of 1 percent or less. Each of these diversions was constructed to outlet into wooded space between trails and lift lines where a natural surface water channel carried the water safely downhill without erosion and into the sediment basins.

As access roads were constructed, surface-water ditches were also constructed; all cut and fill slopes were seeded and mulched immediately after construction.

With all of this construction activity, one could almost visualize a scarred landscape. But there is none. Engineers designed the ski trails so that they are not visible from the highway from either direction of approach until the viewer is directly opposite the ski development.

The Mount Washington Development Company has demonstrated that when conservation practices are included in development plans, the adverse effects on the area and its environment are minimal.

The White Mountains have retained their magnificent splendor, and the Ammonoosuc River continues along its path unaware of man's activity nearby. ♦



One of the sediment basins (above) built to prevent sediment from entering the Ammonoosuc River. A ski trail (below) immediately after it was seeded and mulched. (Photographs courtesy of Mount Washington Development Company.)

A timely takeoff with RC&D

by Neal C. Beery
District conservationist, SCS
Woodsfield, Ohio

Construction of the long-awaited Monroe County Airport near Woodsfield, Ohio, was well underway. But there was trouble.

Increasingly, severe soil erosion halted construction—and dimmed the optimism for economic expansion that had grown with the new facility.

The airport, built in a rough rolling area, developed erosion problems almost as soon as construction began. They increased as construction progressed and as more and more of the area was paved.

"We were aware that the landfill areas were eroding rapidly and that part of our drainage system had already washed away. The runways were in real danger of being undermined," said Vincent Ballard, attorney for the Monroe County Airport Authority. "And silt moving into a nearby stream was also a problem."

The Monroe County Airport Authority, appointed by the county commissioners, requested help in halting the damaging erosion from the Monroe Soil and Water Conservation District. Working through the district, the Soil Conservation Service helped the airport authority to develop an action plan. The plan included measures to control runoff water and establish grass on bare, sediment-producing areas. Along with the seeding suggestions, SCS prepared the necessary structural designs for the project.

"The services provided by SCS came at a critical time," said Ballard. "The airport authority had no funds to hire a consultant to determine what needed to be done."

The airport authority had asked sponsors of the five-county Buckeye Hills Resource Conservation and Development (RC&D) Project for financial assistance. It got $10,000 in RC&D financial assistance and much needed technical help.

Preliminary work to prepare the 28 acres of bare, eroding land for revegetation required more than an equal amount of money from the airport authority. This work included grading, removing rocks, and installing large mechanical structures, surface drains, and diversions to carry the runoff to protected outlets.

The labor force and much of the equipment were provided by the Monroe County Engineering Department; some heavy equipment had to be rented.

With grading and other construction work completed, the final step was to reseed the disturbed land. This work was contracted. Lime, fertilizer, and grass seed were spewed from a firehoselike nozzle on a slow-moving tank truck. Then mulch was applied, also by machine.

That eroding and badly gullied land is now well covered by tall fescue and crownvetch. "The excellent stand of grass has made the problem areas safe from water damage and has added beauty to the entire airport," said Clifford Ring, former county commissioner and a member of the airport authority. The new grass cover not only protects the land but also has resulted in an estimated annual savings of $1,818 in maintenance costs for Monroe County.

The airport authority has completed the planning and application of conservation practices on most of the 105 acres of land it controls. Now it is moving ahead with other improvement programs. Two new hangers have been built—one by the airport authority and one by an industrial concern—and another is in the planning stage. A modern administration building is the latest addition. It houses the operations center, weather station, and lighting and air-ground radio communications equipment.

Future plans include extending the present 3,800-foot paved runway to 5,000 feet.

"Many agencies and individuals worked closely with SCS on the project that helped to control erosion, reduce stream pollution, and improve the appearance of the area," said Thurman Christman, chairman of the Board of Commissioners of Monroe County. Our airport is now an important factor in the growth and development of our county. ♦

Sediment that washed from cut and fill areas near the runways was a hazard, and severe erosion threatened the entire airport facility.

Grading, a good cover of tall fescue and crownvetch, and other water control measures provided the needed protection and stabilization.

Tree farming is good business

by Benny Dobson
District conservationist, SCS
Oak Grove, Louisiana

Small timber tracts, when properly managed, can still make money. A. O. "Jack" Warm, a farmer in East Feliciana Parish, Louisiana, knows from experience that this is true.

"We have sold about $13,000 worth of timber from a 40-acre tract of woodland since 1956. We expect to do better on the cuts coming up because the quality and volume of the timber is better than it was 17 years ago. Also, young reproduction for future saw timber is now present."

In 1955, when the late P. A. Warm became interested in selling timber from the 40-acre tract, at least 70 little sawmills were operating throughout the parish. These mills came south from Mississippi as the timber supply to the north played out. They were portable and were set up on the timber tract being harvested. Timber was usually cut to an 8-inch stump. Quite often a woodland tract became a wasteland of stumps, briers, and brush. Nearly always the small woodland owner lost interest in his woodland because that source of income was lost for a long time.

In the early days the little sawmill operators paid as little as 50 cents per thousand board feet.

Years of good woodland management on this tract have increased timber yield and encouraged growth of wildlife food and cover.

Later, as timber became more scarce and competition increased and owners wised up, the price increased to as high as $40 per thousand board feet. It wasn't unusual for a woodland tract cut to an 8-inch stump to produce 15,000 to 20,000 feet of lumber per acre.

The Doyle scale was commonly used by the large mills to determine the volume cut, but it meant nothing to the small mill operators. They used the "lumber scale," which is the actual volume of lumber manufactured. Most small operators logged with horses and wagons. They even loaded wagons by hand when working with small trees. Two-by-fours of that day could be seen coming out of a mill with bark on all four edges.

"There was some good timber in East Feliciana Parish," said Jack Warm. "We had some excellent pine timber, especially on the 40 acres for which we've kept records. Dad asked the Feliciana Soil and Water Conservation District and the Soil Conservation Service for help in managing that tract when offers for his timber reached $2,000. He wanted to sell some timber but didn't want to destroy it."

A soils map of the tract, made earlier by SCS, showed that the timber was on Providence and Lexington silt loam. Woodland interpretations for these soils indicated that the trees could grow to a height of 90 to 100 feet in 50 years.

The stand of trees was about 37 years old at the time and had a sprinkling of virgin pine seed trees. There was an average of 150 merchantable trees per acre. As the dominant trees were already emerging, the real need was to thin from underneath—sort of a salvage operation.

SCS advised the senior Warm to select the smaller and defective trees for harvest and to leave the dominant and codominant trees for further growth. There was no young pine reproduction. The heavy canopy restricting the sunlight had made it impossible for young pine to come in. There wasn't any food for wildlife underneath the trees either.

Warm marked the trees selected for harvest with a long-handled paint brush. He made a paint mark at breast height and another at ground level. All marks faced the west so cutters would have no difficulty finding the trees to be cut.

Warm made a tally as he selected trees for cutting. It showed an average of 60 marked trees per acre, amounting to 5,000 board feet (lumber scale) of timber. With these figures he had the necessary information to bargain in making a sale. Or if he decided to ask for bids he would have a better idea as to what offers to accept or reject.

The marked trees on the 40 acres sold for $7,000—$175 per acre—and were cut in the winter of 1955-56.

When P. A. Warm died, five of his six children were living on the family farm. A blacktopped highway divided the farm, so the heirs had no problem dividing the property to give each equal highway frontage. But the 40-acre woodland tract presented a problem. The heirs decided to practice good woodland management on the tract for the next 20 years. The proceeds from periodic timber sales were to be divided equally.

Each of the heirs is an active conservationist and a cooperator with the Feliciana Soil and Water Conservation District. In 1964 the district assisted them in selecting trees for a pole and piling cut. An average of six sticks of piling per acre, at least 50 feet in length, were marked for sale. This sale resulted in an additional $100 per acre return.

Taking into account the salvage operations following hurricanes Hilda and Betsy, this 40-acre tract has yielded an annual return of more than $20 per acre for the past 17 years.

Openings in the stand can now be made because young reproduction is present. These openings have encouraged growth of wildlife food and cover.

The Warm family thinks that small woodland tree farming pays —in more ways than money. ♦

Don't forget esthetic values

by Philip R. Weatherman
Soil conservationist, SCS
Indianapolis, Indiana

Assisting *all* land users is a pledge that takes the urban conservationist on some unusual assignments—to a cemetery, for example.

The Floral Park Cemetery Association, which operates three cemeteries in Indianapolis, wanted to expand a waterfront mausoleum community at its Washington Park North Cemetery. The space for expansion was there, but because of the topography expensive outside fill material was needed to make the area suitable for construction. And cemetery officials feared that the esthetic value of their 2-acre lake would be diminished by the construction.

Association officials and their architects worked with the Soil Conservation Service and the Marion County Soil and Water Conservation District in preparing a conservation plan for the 80-acre cemetery.

A second small lake was excavated next to where the new buildings were to go up. This provided fill for the buildings and added to the esthetic value of the development. A soil map of the area showed that the soils were suited for lake construction and for use as fill material.

Even cemeteries have conservation problems. SCS assisted in an expansion project of this mausoleum complex in Indianapolis.

A 50-foot-long open channel was designed to connect the two lakes and provide runoff control. As often happens in urban conservation planning, just planning a workable practice is not enough. This channel, for example, had to be more than just workable. The cemetery officials wanted it alined with the street so people could view the main mausoleum over an expanse of uninterrupted water. The channel also had to be limited in width so it could be spanned by a footbridge, and the water had to be deep enough to conceal the bottom of the channel.

During construction, bare banks were sodded almost immediately after final grading. Other disturbed areas were seeded to ryegrass—not just once, but twice! A flock of 50 Canadian geese, year-round residents of the lake, ate the first grass seed almost as fast as it came from the seeder. The second attempt was completed successfully. With young boys as geese herders, the hungry honkers were held off until the seed could be properly covered.

After construction, a jetspray fountain was installed in the center of the new lake.

As with this cemetery, many developers and landowners are concerned with more than just solving soil and water problems. The solutions must often be designed into the total scheme of the development. Soil and water conservation measures should add beauty and esthetic qualities and not detract from the overall effect of a development. ♦

Review

Books

The Use of Land: A Citizens' Policy Guide to Urban Growth. Edited by William K. Reilly. *1973. Thomas Y. Crowell Co., New York, N.Y. 10019. 318 pp., illus. $3.95.*

This book presents a clear forceful argument for improving the way we develop our land for urban purposes. It was prepared by a 12-person committee with broad representation from the fields of education, state and local governments, banking, law, housing, and citizens' organizations. The work was sponsored by The Rockefeller Brothers Fund, which obviously provided sufficent financial support for a first-rate writing and research staff.

The book is not meant just for professional planners or other land use specialists. As its title indicates, it is written for the concerned citizen who wants a better understanding of the forces at work that make better land development so difficult to achieve.

The problems faced in guiding urban development are described accurately and candidly. And after discussing the obstacles to improvement, the book offers some very specific recommendations on what can and should be done in the way of (1) educating citizens to dispel old and outmoded concepts of land development; (2) setting up new institutions, both public and private, which contribute to better land development; (3) changes in state and local laws governing land use; and (4) new federal legislation to encourage state governments toward more positive action in land use guidance.

The book has a strong environmentalist viewpoint. It attacks the wastefulness of our present urban land use patterns, which use up too much land in uneconomic sprawl. It attacks the unethical practices of companies selling "second home" subdivisions that exploit rural lands at the expense of naive city dwellers and create natural resource problems virtually impossible to solve.

The book is equally strong in its viewpoint on housing needs of low-income families. It attacks the selfish practices of local governments that zone their land on the basis of admitting only the most affluent homeowner or the business or industry that pays high taxes and produces few problems.

The book concludes with a strong plea for civic organizations to provide leadership in their community in deciding on what should be protected and preserved, on what development needs should be met and how and when.

Many of the book's recommendations will be controversial—new legal concepts are proposed, new political responsibilities are demanded. Many lawyers and politicians will resist these efforts to rock the boat, but the boat is already being rocked.

Meetings

January

14–17 North American Game Breeders and Shooting Preserve Association, Inc., Sacramento, Calif.
16–17 National Council of Farmer Cooperatives, Washington, D.C.
17–19 American Farm Bureau Federation, Atlantic City, N.J.
18–23 American National Cattlemen's Association, San Diego, Calif.
20–24 National Association of Home Builders, Houston, Texas
23–26 National Woolgrowers Association, San Diego, Calif.
31–Feb. 2 Sixth Annual Catfish Farmers of American Convention and Trade Show, Memphis, Tenn.

February

2–3 Society for Range Management, Tucson, Arizona
10–14 National Association of Conservation Districts, Houston, Texas
20–22 Land Improvement Contractors of America, Williamsburg, Va.
20–23 American Camping Association, Atlanta, Georgia
21–22 Southern Forest Institute, Atlanta, Georgia
25–Mar. 2 American Association for the Advancement of Science, San Francisco, Calif.

March

8–14 Associated General Contractors of America, San Diego, Calif.
9–13 Association for Supervision and Curriculum Development, Anaheim, Calif.
10–14 National Farmers Union, Milwaukee, Wisc.
10–15 American Society of Photogrammetry, Washington, D.C.
15–19 American Seed Trade Association, Chicago, Ill.
17–22 American Concrete Pipe Association Technical Conference, San Francisco, Calif.
26–28 Agricultural Research Service Water Harvesting Symposium, Phoenix, Arizona
29–30 National Wildlife Federation, Denver, Colo.
31–Apr. 3 North American Wildlife and Natural Resources Conference, Denver, Colo.

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Reading this book will help you to better understand who is rocking the boat and why. —**Warren T. Zitzmann, *urban planning specialist, SCS, Washington, D.C.***

New publications

Composted Municipal Refuse as a Soil Amendment. *1973. University of Florida (Gainesville). 67 pp. $3.50.* Evaluates processed residential refuse as a source of plant nutrients and as a soil amendment.

Problems and Opportunities in Management of Combustible Solid Wastes. *1973. International Research and Technology Corporation (Washington, D.C.). 517 pp. $9.75.* A report on the costs, environmental impact, markets, use of federal procurement, and other incentives or disincentives to encourage resource recovery.

Resource Recovery from Raw Urban Refuse. *1973. Bureau of Mines (Washington, D.C.). 33 pp. $3.75.* Describes a pilot plant operation to recycle and reclaim municipal refuse.

The annual domestic subscription price of SOIL CONSERVATION has been raised to $5.65, effective with this issue. The single copy price is now $0.50. The foreign subscription price is $7.10 per year.

Soil surveys

Georgia

Cherokee, Gilmer, and Pickens Counties. By Dan H. Jordan, Glenn L. Bramlett, Gene A. Gaither, Ray J. Tate, Marion M. Blevins, and James O. Murphy. *1973. Soil Conservation Service and Forest Service in cooperation with the University of Georgia, College of Agriculture, Agricultural Experiment Stations. 73 pp., illus.; maps.*

Kansas

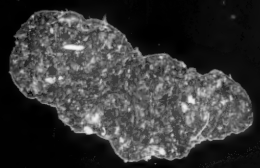
Edwards County. By William E. Roth. *1973. Soil Conservation Service in cooperation with the Kansas Agricultural Experiment Station. 64 pp., illus.; maps.*

Louisiana

St. James and St. John The Baptist Parishes. By Warren L. Cockerham, Ray E. Dance, Almond G. White, and Bradley E. Spicer. *1973. Soil Conservation Service in cooperation with the Louisiana Agricultural Experiment Station. 46 pp., illus.; maps.*

Oregon

Alsea Area. By John F. Corliss. *1973. Soil Conservation Service and Forest Service, and U.S. Department of the Interior, Bureau of Land Management, in cooperation with the Oregon Board of Natural Resources and the Oregon Agricultural Experiment Station. 82 pp., illus.; maps.*

Texas

Scurry County. By Marvin L. Dixon, William H. Dittemore, Jr., and Harold W. Hyde. *1973. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 56 pp., illus.; maps.*